FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport

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DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:

Jan. 20 ...	**Lecture, "The Cost of Air-Ton-Miles, Compared with other Forms of Transport," by Lord Montagu of Beaulieu, before R.Ae.S.**
Feb. 20–22	**Aero Club of France Grand Prix**
Mar. 20–22	**Aero Club of France Grand Prix**
April 20–22	**Aero Club of France Grand Prix**

EDITORIAL COMMENT

IT seems to be reasonably certain that before long Mr. Churchill will leave the War Office to become Secretary of State for the Colonies. That means also that the post of Secretary for Air will become vacant, and will thus afford the Prime Minister an opportunity of correcting what most people regard as a mistake in policy and of replacing the present anomalous system of control of the War Office and the Air Ministry by a single Minister by two separate heads of these great departments. Whether he will do so remains to be seen, but it is likely that a determined effort will be made to induce him to do so. We agree that Mr. Churchill has not done at all badly in the dual capacity he has been called upon to fill. Probably he has done a good deal better than any other member of the present Government would have done in the same circumstances, but that does not justify the continuance of what at the best can only be regarded as a dubious experiment.

The Future of the Air Ministry

Here let us say that we wish it had been possible for the present Air Minister to have carried on in that capacity alone, free from the trammels of any other office. There is no member of the Government who knows as much about the Air Service and its needs, or who has so wide an outlook on the future—especially in the matter of civil aviation—as Mr. Churchill. It was due to him almost entirely that the outbreak of war found the Navy in possession of an aerial arm of any kind. During the War and since he has given every evidence of a complete understanding of the problems of aerial policy, and we regret exceedingly that the re-shuffling of the Cabinet should now be leading to his retirement from the Air Ministry. However, he is going, and the principal thing that matters now is to see that the Pooh-bah scheme of giving one Minister control over two or more Departments of State is not allowed to be perpetuated without a vigorous protest.

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Aircraft for Garrison Work

At the Royal United Service Institution the other night a most interesting and instructive lecture was given by Wing-Commander Gossage on the subject of "The Use of the Air Force for Replacing Military Garrisons." The lecturer pointed out that at a time when economy should be a guiding light, the Navy and Army are being maintained at approximately their pre-War establishment, with the Air Force superimposed. If the latter were properly used, it could effect an absolute saving in reducing the numbers of Army garrisons by performing many of their duties. Last summer six garrisons were isolated by enemy tribesmen within 200 miles of Baghdad, and about 1½ divisions had to be sent from India to effect their relief at great cost and at the expense of numerous casualties. If the local disorder had been dealt with in its incipient phases we should never have been entangled in this very costly small war. Every place within the 200 miles' radius of Baghdad could be under observation by aircraft centred at that place. Before the rising of last

summer the force employed in Mesopotamia numbered 47,000 fighting men with two aeroplane squadrons, costing nearly £20,000,000. By increasing the squadrons to ten the detachments could be reduced to 7,900 men and the cost to £10,000,000. The lecturer put his finger on the spot when he said that the trouble is that the General Staff has not yet learned to think aerially. They are shy of trying something that is new, and that they do not thoroughly understand. The cheaper method, however, will probably enforce itself.

We are always diffident about interfering with matters that are the province of the military experts, but in this case we think it is permissible to express complete agreement with the lecturer, because we have the lessons of the campaign in Somaliland to demonstrate what can be done by aircraft, intelligently handled. In that case it is a matter of historical record that we had been trying, by the older methods of making war in a country devoid of means of rapid communication, to put an end to the troublesome antics of the Mad Mullah, who for years had been a thorn in our side. Several costly expeditions had been organised, with scant success. In fact, the honours were on the side of the elusive Mullah, who had virtually compelled us to abandon the friendly tribes of the *hinterland* to his tender mercies and to concentrate what forces we had on the spot in a narrow belt of the coastline. Once again, it is a matter of record that when at last it was determined to see whether aeroplanes could be employed to advantage in another campaign against the Mullah, the whole affair occupied fewer weeks than we had been years at the job, and ended in his complete defeat and the annihilation of his forces. So effectually did the aeroplanes do their work that not a word has been heard of the Mullah since. Obviously, what aircraft could do in Somaliland they could do in Mesopotamia—if the pedantic soldiers of the General Staff would permit the experiment to be tried. It certainly seems clear that if we can save the services of 38,000 men and £10,000,000 such an experiment—though we should not be disposed to agree that it is really an experiment—ought to be initiated without an instant's delay.

It ought furthermore to be possible to extend the principle of employing aircraft to take the place of army units for garrison work in all countries in which communications are bad, and there is the risk of small garrisons being isolated and invested by hostile forces. When such investment happens, it inevitably means a series of very costly operations to extricate them. They cannot be left to their fate, and even if they cannot be relieved in time punitive expeditions have to be organised. Where aeroplane squadrons are concerned, however, in the last resort they can get away without having to be relieved, to return again reinforced to inflict due punishment on the enemy. The whole problem raised in Wing-Commander Gossage's lecture is one that will have to be very carefully examined by the General Staff in collaboration with the Air Staff.

* * *

The Magneto Industry

If there is one industry which, more than another, is to be described as the "key" to aviation it is the magneto trade. So long as aircraft depend for their propulsion upon the internal combustion engine the magneto will be an essential component of every machine. The Germans, with characteristic vision, saw that before the War, and took measures to create a monopoly. How successful they were in their efforts, and how nearly we had our operations, not only in the air but by land, brought to a full stop for want of a British source of magneto supply history is there to record. We "muddled through," thanks to the almost superhuman efforts of those who, at the end of the War, had succeeded in creating a great industry where none existed before. So alarmed was the Government in the early stages of the War that it accepted the recommendations of a committee appointed to examine the subject, and announced publicly that it would put them into effect at the earliest possible moment. Those recommendations were that British magnetos should be specified on all Government engines and subsidised vehicles; a prohibitive tax on, or total prohibition of, German magnetos; a heavy duty on all other foreign magnetos; and prohibition of foreign controlled magneto works in this country.

So far, nothing has been done, though it is stated that the Government does intend to include the magneto in a list of imports to be restricted or prohibited under the provisions of a Bill to be introduced early this year. In the meantime, this essential industry is suffering severely from German competition. Owing to the rate of exchange the German manufacturer can sell his machine in this country at about £5, whereas it costs nearly three times that amount to produce the British article. It is possible that the latter costs are too high, but in any case they could not be brought down to anything like the figure at which the German product can at present be sold here. Obviously, Germany is out to re-establish the monopoly she held before the War, and will stick at nothing to gain her ends. There is only one way in which this "key" industry can be adequately protected, and that is by a total prohibition for a term of years of the import of German magnetos.

* * *

The Capital Ship Controversy

There seems to be no finality to the controversy as to the use of the capital ship in naval war. Arguments for and against the nine million pound battleship or battle-cruiser are being reiterated again and again in a way, we are bound to say, that begins to destroy any faith one might have had in the ability of naval officers to visualise the needs and duties of the sea service in the next great war. Unfortunately, the argument being of a highly technical character, and thus more or less confined to the "experts," the issues are becoming obscured in a cloud of professional controversy. That is probably inherent to the character of the controversy and the controversialists. But it is, as we say, unfortunate that this should be so, because the argument has been so narrowed that it has become confined to the question of whether the capital ship, with all its attendant "luggage," or the submersible is to be the type of the future. One or two of the prominent personalities who are endeavouring to prove that the rest know nothing about the question have introduced the subject of aircraft in so incidental a manner that we suspect them of having done it more for the sake of effect than because they have any profound convictions as to the precise rôle to be played by aerial forces in the next naval war.

Having written it, we are almost inclined to regret having penned this last sentence, because it would appear to connote a state of mind as narrow as that

Tombs of the Mamelukes in the "Dead City," Cairo

we have deplored in others. The truth seems to be that it is impossible to speak of "naval" or "land" war in the old terms, in so far as concerns wars that deserve to be called "great." Of course, there will always be small affairs which can best be described as policing wars, such as we have recently been concerned in in Mesopotamia and on the Indian frontier. These are not what we have in mind at all. In attempting to forecast the next great war we must regard it as simply a war—neither naval, military nor aerial, but a combination of all three. Further, we must bear in mind that in the last war the aerial arm did not enter into its own. Magnificently it performed its allotted task, but that task was circumscribed in relation to what it would have been called upon to undertake had the war gone on for another year.

Knowing the enormous preparations which were being made for carrying the war into the enemy's country by the air, we are the better able to appreciate the fundamental truth that has been set forth already—that war in the future will be a co-ordinated affair of all three services. To attempt to lay down an arbitrary standard for either service, whether of ships, guns or aircraft, without closely studying the potentialities of the rest is mere futility. That is what the distinguished naval officers and others who are conducting the controversy are doing. They visualise naval war as an affair between ships, with a grudging half-acknowledgment that aircraft will be present on the day of battle, but will be fulfilling a subsidiary and almost unknown rôle. They completely fail to appreciate that here they have a factor which may, even probably will, prove to be the decisive one, and which may easily falsify all their prophecies and theories so easily evolved and airily set forth. Without trying to be dogmatic, we should advise for these gentlemen a closer study of the history of aerial development and a serious enquiry into the possibilities of the future.

CONTINENTAL AIR TRAFFIC

THE appended official Air Ministry table gives the numbers of aircraft of all nationalities which departed for and arrived from the continent, and the total numbers of passengers who travelled on continental air services during the quarter October–December, 1920. Similar tables covering monthly periods are to be issued regularly in future.

The totals of departures and arrivals of aircraft to and from the continent since the opening of the first service on August 26, 1919, until the end of 1920 were :—Departures, 2,131 ; arrivals, 2,022 ; grand total, 4,153. British machines contributed 3,321 to the latter figure, French 721, Belgian 104, and other nationalities 7.

The totals for the three months October–December, 1920, exceeded those for the six months October, 1919–March, 1920. During the former period, departures and arrivals were each 406, whereas during the latter period they were 388 and 346, respectively. The table of last week's flights is also given below.

CONTINENTAL AIR TRAFFIC OCTOBER TO DECEMBER, 1920.

Nationality	CROYDON AND LYMPNE — Numbers of Aircraft										CRICKLEWOOD — Numbers of Aircraft									
	Paris.		Brussels		Amsterdam		Other Places		Total		Paris		Brussels		Amsterdam		Other Places		Total	
	Dep.	Arr.	Dep.	Arr.	Dep.	Arr.	Dep.	Arr.	Dep.	Arr.	Dep.	Arr.	Dep.	Arr.	Dep.	Arr.	Dep.	Arr.	Dep.	Arr.
British ..	130	130	3	6	31	32	12	13	176	181	54	49	29	28	23	23	4	3	110	103
French ..	88	90	—	—	—	—	1	1	89	91	—	—	—	—	—	—	—	—	—	—
Belgian ..	—	—	8	9	—	—	—	—	8	9	—	—	21	21	—	—	—	—	21	21
Dutch ..	—	—	—	—	2	1	—	—	2	1	—	—	—	—	—	—	—	—	—	—
Total ..	218	220	11	15	33	33	13	14	275	282	54	49	50	49	23	23	4	3	131	124
	Passengers (all places abroad) : Dep. 379 , arr., 437 ; total, 816										Passengers (all places abroad) : Dep., 278 ; arr., 269 ; total, 547									

THE LONDON-CONTINENTAL SERVICES

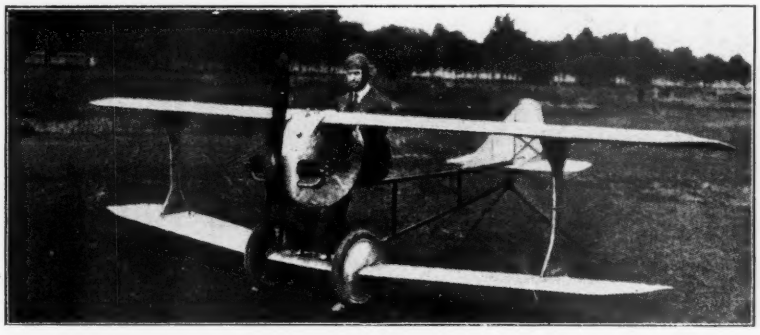
FLIGHTS BETWEEN JANUARY 9 AND JANUARY 15, INCLUSIVE

Route	No. of flights	No. of passengers	No. of flights carrying: Mails	No. of flights carrying: Goods	No. of journeys completed	Average flying time	Fastest time made by	Type and No. (in brackets) of Machines Flying
						h. m.		
Croydon-Paris	6	7	1	5	5	2 58	Breguet F-CMAI (2h. 10m.)	B. (3), G. (1), Sa. (1), Sp. (1).
Paris-Croydon	8	9	4	6	6	3 0	Spad F-CMAV (2h. 19m.) ...	B. (4), G. (1), Sa. (1), Sp. (1).
Cricklewood-Paris ...	1	6	1	1	1	4 15	H.P. G-EATK (3h. 15m.) ...	H P. (1).
Paris-Cricklewood ...	2	5	1	2	0	—	—	H.P. (1).
Croydon-Brussels ...	3	2	3	3	2	1 55	Airco 4, O-BADO (1h. 40m.)	A.4 (3).
Brussels-Croydon ...	2	—	2	2	2	2 47	Airco 4, O-BABI (2h. 20m.)	A.4 (2).
Cricklewood-Brussels ...	1	—	1	1	1	2 28	Airco 9, O-BELGE (2h. 28m.)	A.9 (1).
Brussels-Cricklewood ...	2	—	2	2	1	1 7	Airao 9, O-BELGE (1h. 7m.)	A.4 (1), A.9 (1).
Totals for week ...	25	29	15	22	18			

FLIGHT

THE PISCHOF 16 H.P. "AVIONNETTE"

IT would appear that the honour of producing the first really practical "aero-scooter" falls upon M. de Pischof, one of the pioneers of aviation in France. His latest effort, which we illustrate and briefly describe this week, is particularly interesting, not only from the point of view of the small sporting type of machine, but as an example of aeroplane design and construction. The Pischof "Avionnette" is remarkable for its low-powered engine, as well as its small size, the engine being a two-cylindered horizontally opposed Clerget developing but 16 h.p. It is of interest to note in passing that as far back as 1908 M. Pischof carried out some trials with a monoplane also fitted with a 16 h.p. 2-cyl. engine. It seems that this little machine is by no means a freak or toy, neither is it an orthodox type of machine merely cut down in size and weight, but is one designed specially for its purpose—every detail having been carefully thought out, so that it fulfils its particular function in the simplest and most efficient manner possible.

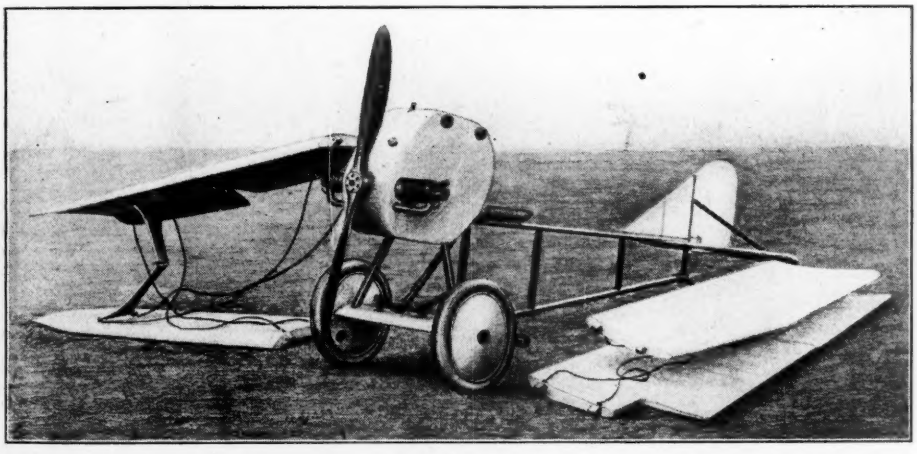


The Pischof "Avionnette": Three-quarter front view, from which it may be seen that the pilot has an exceptionally good range of vision.

The "Avionnette" has already made several successful trial flights, and in spite of its small size, is claimed to possess remarkable stability and flying qualities. The greatest height so far attained has been 4,000 ft. in 52 minutes, but it is anticipated that a ceiling of 6,000–6,500 can be obtained.

The speed range of the "Avionnette" is 36–60 m.p.h., and it carries sufficient fuel for two-hours' flight, the petrol consumption being 1.3 gals. per hour; oil consumption is said to be "practically nothing." As regards the machine itself, as may be seen from the accompanying illustrations, it is of decidedly unique design. It is a tractor biplane, with a body that may be described as either of the *fuselage* or outrigger type. It is of metal construction practically throughout, exception being in the plane covering and interplane struts. The most important feature of this little 'bus is undoubtedly the ingenious method of assembling and dismantling the main planes, and the facility with which either can be accomplished. The main planes are made up of two self-contained units, consisting of an upper and lower plane section, on the port and starboard sides respectively. The upper and lower sections of each unit are separated by a single I interplane strut, which is hinged in the middle—the hinge-joint being locked by a quick-release pin. In dismantling, the removal of four steel bolts at the wing-root attachments, disconnects the wing-units together with the wing bracing, from the body. Removing the hinge-pins in the interplane struts, the latter fold in, bringing the upper and lower plane sections together, so that they take up very little space. Assembling is easily and quickly accomplished. Each wing unit is connected to the body—this being done with little difficulty since, with the interplane strut and bracing "slack," the wings may be more or less freely manœuvred—after which the interplane strut is "straightened" and locked. This has the effect of tightening up the bracing, and inasmuch as the latter is never disconnected, the adjustment is more or less permanent and the wings need no further rigging once the interplane struts are straightened.

The attachment of the top plane is made to a *nacelle*-like erection, serving the several duties of engine bearer, fuel tanks mounting, and pilot's "wind shield," above the *fuselage* or outrigger. The lower sections are attached to the landing chassis—or its equivalent, for, strictly speaking, the latter really comprises a small plane-centre-section the front spar of which forms the axle for the wheels, which are unsprung, it having been found that with such a small and light machine the large-sized tyres are quite sufficient to absorb all landing shocks. It is further claimed that the lower plane being as low as it is, a considerable cushioning effect is produced when landing, which reduces the shock as well as acting as a brake. The wheels being well forward, it is said that it is practically impossible to turn the machine over on its nose.



The Pischof "Avionnette": In this view an attempt has been made to convey an idea of the ingenious method of dismantling and folding the wings, by means of the hinged interplane strut.

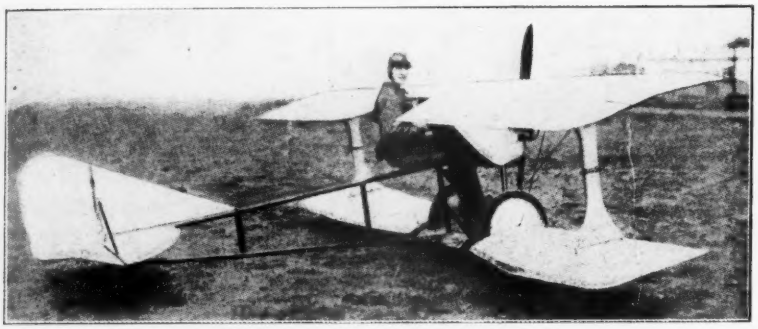
The *fuselage* consists of two superimposed steel tubes, connected by vertical tubular members. The tail plane, which is of the lifting type at 0° incidence, carries a load of about 16 lbs. The pilot is located on a species of plough seat mounted on the top *fuselage* tube, forward of the trailing edge of the top plane. The top plane is cut away in the centre to receive the body of the pilot, who, from his high position, has a very good range of vision. The control stick, which is only some 12 ins. in length, is mounted on the top *fuselage* member in front of the pilot, whilst the rudder control, consisting of two pedals, is mounted on the lower centre section.

We understand that M. Pischof is now constructing a second "Avionnette" in which several modifications have been introduced. Amongst the most important of these may be mentioned the replacing of the two tubular *fuselage* members by a streamline *fuselage*—undoubtedly an improvement.

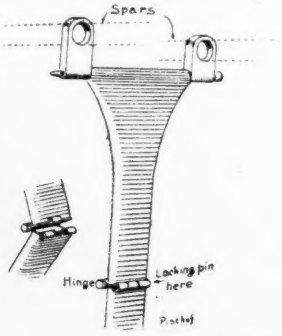
A *cabane* is also fitted on the top plane, whilst the area of the main planes has been increased slightly. The tail surfaces also have received certain alterations.

The principal characteristics of the Pischof "Avionnette" are :—

Span	17 ft.
Length	11 ft. 6 ins.
Height	4 ft. 3½ ins.
Wheel track (width folded) ..	2 ft. 7½ ins.
Area of main planes	80¾ sq. ft.
Area of tail plane	5¼ sq. ft.
Weight of machine empty	225 lbs.
Loading per sq. ft. ,, ...	2.78 lbs.
Loading per h.p. ,, ...	14 lbs.
Speed range	56–60 m.p.h.
Climb	4,000 ft./52 mins.



The Pischof "Avionnette": Three-quarter rear view.



The Pischof "Avionnette": A diagrammatic sketch of the hinged interplane strut and its attachment to the wing spars.

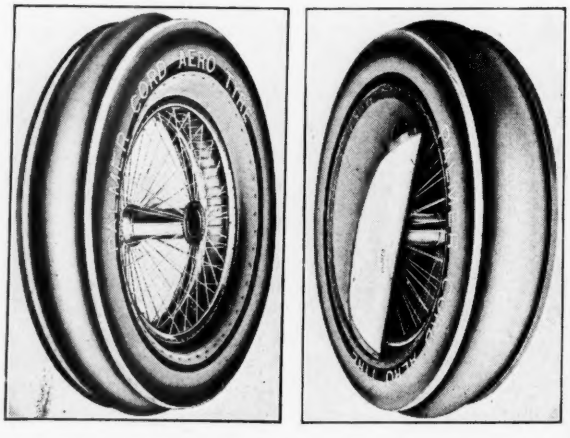
PALMER BROAD TREAD AERO TYRES

UNDER certain conditions, especially at this time of the year, when aerodromes become model "Lake Districts," or at the best, a trifle soft, considerable difficulty is experienced in getting aeroplanes—and particularly those of the larger size—off the ground. In landing, too, matters are by no means pleasant, as a machine will very easily turn over on its nose by the wheels sinking into even a moderately soft patch of ground.

During the War, Messrs. Palmer Tyre Co., of Shaftesbury Avenue, designed an aeroplane tyre specially to overcome this difficulty, which, we understand, it successfully accomplished. As may be seen from the accompanying illustration, this tyre has an exceptionally broad tread, which enables the machine to obtain a hold on the surface of the ground by virtue of the large area of contact and get away under its own power where, under similar conditions, a machine fitted with ordinary round tread tyres would be hopelessly bogged. These tyres have proved equally successful on loose sand.

This tread is made of rubber of a very low specific gravity, and the added weight is consequently negligible.

Palmer broad tread aeroplane tyres are interchangeable with the corresponding sizes of Palmer round tread aeroplane tyres, and are supplied in the following dimensions to fit Palmer standard aeroplane rims of Z, V and T types: 700 by 100, 750 by 125, 800 by 150, 900 by 200, 1,100 by 220, 1,250 by 250, and 1,500 by 300 mm.



The Palmer Broad Tread Tyre, which has been designed specially for work on boggy or waterlogged aerodromes.

Aeronautical Maps.

DURING the reading of a paper before the Royal Geographical Society on Monday, on "International Aeronautical Maps," Lieut.-Col. E. F. W. Lees, D.S.O., claimed that the aerial map could scarcely show too much detail, provided there was no overcrowding. The exact position and shape of railways, roads, rivers, towns, etc., must be shown as far as the scales employed would allow, and from a local map an airman who got only a fleeting glimpse of the ground should be able to locate himself. In the production of these maps it was proposed to show on a pale green or pale yellow ground :—Aeronautical information in black; water in blue; all artificial structures in red, except those which came under the headings "Aeronautical information" or "Waterways"; roads in deep yellow or burnt sienna; and woods in green.

The three controversial points in regard to general maps, Col. Lees said, were :—Whether Mercator's projection was the most suitable; whether hill shading on the layer system should be employed; and whether railways should be shown in red and roads in burnt sienna, or railways in black and the roads in red.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

COMMITTEE MEETING

A MEETING of The Committee was held on Wednesday, January 12, 1921, when there were present:—Brig.-Gen. Sir Capel Holden, K.C.B., F.R.S., in the Chair, Mr. Ernest C. Bucknall, Lieut.-Col. Spenser D. A. Grey, D.S.O., Lieut.-Col. Alec Ogilvie, Lieut.-Col. Mervyn O'Gorman, C.B., and the Secretary.

Election of Members.—The following New Members were elected:—

Flying Officer Hugh Lewis Pingo Lester, R.A.F.
Flying Officer Louis George Paget, R.A.F.
Capt. Thomas Laurence Purdom (T.F. (R.)).
Albert Edward Thomson.
James Percy Ashley Waller.
Frank Yonge Urquhart Weldon (late Flight-Comdr.).

Fédération Aéronautique Internationale.—The Meeting of the Bureau of the Fédération Aéronautique Internationale was held in Paris on Monday, January 10, 1921.

Prince Roland Bonaparte was in the Chair, and representatives from the following countries were present:—America, Belgium, France, Great Britain (Lieut.-Col. Mervyn O'Gorman, C.B., and H. E. Perrin), Holland, Italy, Sweden, Switzerland.

SCHNEIDER CUP

The regulations for this year's Contest were drawn up.

The date for entry was extended to June 1, and in addition to the Entry Fee, the entrant has to deposit 5,000 francs per machine as a guarantee of the machine taking part. This deposit is returned in respect of all machines taking part in the Contest.

The Contest is divided into three tests:—

1. *Water-tightness Test.*—For this test the machine must remain afloat for 6 hours, with a full supply of petrol and oil for the whole contest.
2. *Navigability Test.*—For this test the machine must fly in a closed circuit over a course of 5 to 10 sea miles. During this test the machine must be taxied on the water over two distances of half a mile.
3. *Speed Test.*—The speed test will be contested over a distance of 200 sea miles in a closed circuit of a minimum distance of 5 sea miles.

Any repairs necessary after the Contest has started may only be carried out at sea, but these repairs must not modify the original condition in which the machine was presented.

Competitors not carrying out the navigability test satisfactorily, may start again for a second and last attempt.

The date was provisionally fixed for September 30, 1921. Full particulars will be published later.

AERIAL DERBY AROUND THE WORLD

The draft regulations drawn up by the Aviation Commission of the Aero Club de France were presented, but it was decided to defer the consideration until they had been submitted to the Aero Club of America.

Several other matters were discussed, including Meteorological Reports, Fédération Aéronatique Internationale Brevets, Gordon Bennett Balloon Race.

THE FLYING SERVICES FUND

(*Registered under the War Charities Act*, 1916)

Administered by the Royal Aero Club

For the benefit of *Officers, Non-Commissioned Officers and Men* of the ROYAL AIR FORCE who are incapacitated while on duty, and for the widows and dependants of those who are killed or die from injuries or illness contracted while on duty.

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The Right Hon. LORD KINNAIRD.

Committee:
H.R.H. THE DUKE OF YORK, K.G. (*Chairman*).
Lieut.-Col. A. DORE, D.S.O.
Mr. CHESTER FOX.
Squad.-Leader T. O'B. HUBBARD, M.C., R.A.F.
Group-Capt. C. R. SAMSON, C.M.G., D.S.O., R.A.F.

Secretary:
H. E. PERRIN.

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Subscriptions	£	s.	d.
Total subscriptions received to Nov. 1, 1920..	17,166	9	6
Collected at Church of England Parade Services at some R.A.F. Stations	12	19	1
Squad.-Ldr. P. Litherland Teed, R.A.F. (Ninth contribution)	4	4	0
	17,183	12	7

Offices: THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.

H. E. PERRIN, Secretary.

No Drops from Eiffel Tower

IT appears that the authorities are becoming a little chary of experiments from the Eiffel Tower. While they allowed one Frenchman to demonstrate a device for climbing up a rope, they refused M. Damblanc permission to leap from the second platform with a view to testing his latest helicopter parachute. It may be recalled that a parachute drop from the Eiffel Tower in 1912 cost the life of M. Reichelt.

"Airship Flights of Fact and Fancy"

UNDER the above title Air-Commodore Maitland last week gave on behalf of the Royal Aeronautical Society a delightful lecture for juveniles. He once again gave many fascinating details of his voyage in "R. 34" across the Atlantic and back and in his earlier remarks gave an outline of the big airships of the future as he visualised them.

They were going to be the big aerial liners of the future, and before the boys present were quite grown up he was sure they would be travelling about the world in these large airships, and they would find them very comfortable and nice. (Cheers). He showed on the screen the aerial liner a few years hence, and said there was no reason why they should not fly to Australia *via* Montreal and Vancouver. (Cheers). And he did not see why they should not make the journey in about twelve days. They would have dining accommodation; the cabins would probably be on the top; and the saloons would be comfortable. A rigid airship was now being completed, equipped and furnished in such a way, which would accommodate fifty people. The big airship of the future would not land as it did today. It would fly up to a high tower, drop a cable, which would be attached to another cable on the ground, which went up the centre of the tower, and be hauled down by electricity to the top of the tower, where she would be held by the nose. Passengers would then disembark into the tower and come down in a lift.

The airships used mostly in this country during the War were the small non-rigid type officially known as "S.S's.," which was short for "Submarine Scouts." These airships were operated entirely against the German submarines, and the operations proved to be a very thrilling and fascinating game of "hide and seek." After showing the audience, by a series of pictures, how the airships took part in the game of "hide and seek," Commodore Maitland referred to the use of parachutes during the War from kite balloons, aeroplanes and airships, but more particularly from kite balloons. Seven hundred and fifty kite balloon observers descended by parachute from burning British balloons, and only three failed to open. Some 800 also descended from French kite balloons. It required a courage all its own, and it was not everybody who relished stepping off a burning kite balloon in a parachute; but there was more than one instance of a kite balloon observer parachuting from his burning balloon twice in one day. Had the War lasted much longer, he thought there was no doubt that parachutes would have been used from several types of aeroplanes. As it was, we dropped a number of spies in the dark behind the German lines from aeroplanes, and the Germans retaliated by doing the same behind our lines. He was told that German spies, dressed as British officers, who had been dropped behind our lines by parachutes, actually misdirected the traffic during our retreat in 1918.

A PROPOSED AMERICAN TRANSPORT AEROPLANE*

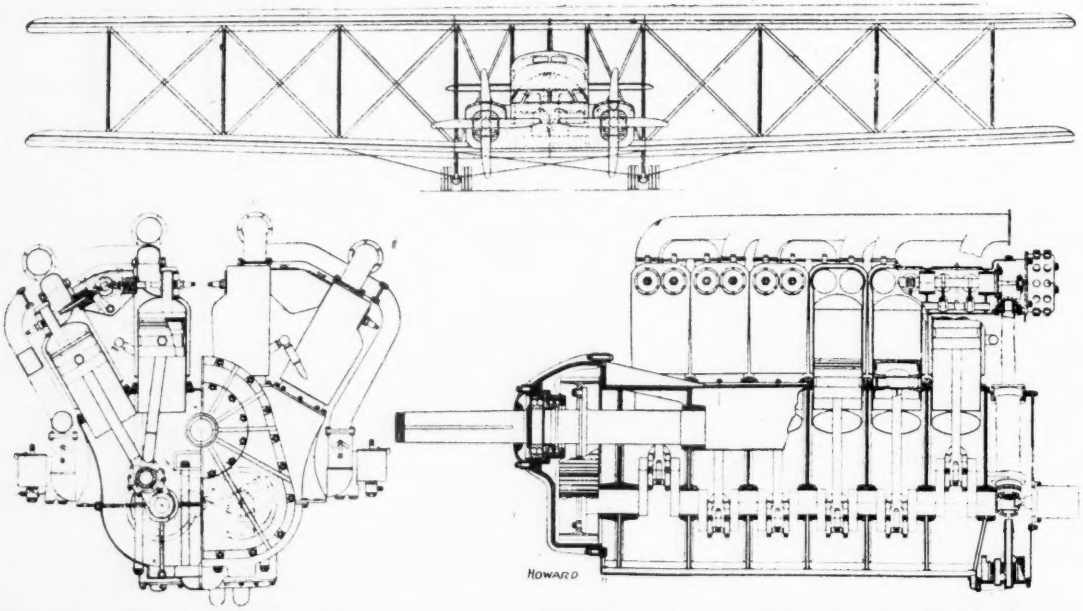
EVERY aviation prophet has predicted the coming of large transport machines in the near future, but designers, in this country (U.S.A.), at least, have not taken them up seriously. The machine illustrated and briefly described herewith not only is designed by Raymond M. Howard, consulting aeronautical engineer, Detroit, Mich., to carry forty passengers with all their baggage, but contains several interesting constructional features that are not as radical as they may seem at first sight. The use of metal construction, variable pitch propellers and supercharging are admitted to be the next steps in development.

The problem of supplying sufficient power to drive a large aeroplane has brought out several different solutions. Owing to the limited power available in one unit, the majority of the giant aeroplanes built have been powered by a multiplicity of engines; in several machines as many as six have been used successfully. The two general types of construction are, a central power group and a distribution between the wings. The solution proposed here is the employment of very large power units placed very close together but driving the propellers directly.

This new transport machine is a biplane, and is planned to carry forty passengers, a crew of four and about 2,400 lb. of freight. It is constructed of steel and aluminium, thus reducing fire risk. It is equipped with two 1,200 h.p. dual V-engines, designed especially for the purpose, driving 12-foot, four-bladed, variable pitch propellers which are patented by the designer.

The principal dimensions are as follows —

Span	125 ft.
Chord	16.5 ft.
Gap	14 ft.
Height overall	19 ft.
Length overall	75 ft.
Total area	3,864 sq. ft.
Petrol tank capacity	1,200 gal.
Endurance	12 hr. at 100 m.p.h.
Maximum speed	130 m.p.h.
Power loading	15.4 lb. per h.p.
Wing loading	9.6 lb. per sq. ft.
Total weight	18.5 tons



THE HOWARD TRANSPORT AEROPLANE AND ENGINE: A front elevation of the machine is shown at the top, and, below, sectional views of the "Twin-engine units," as proposed by Raymond M. Howard

The engines are described as twin-twelves. The general construction can be seen from the assembly views. The cylinders are 6 by 8 ins., and the total displacement is 5,428 cubic inches. The weight is expected to be very low for the power. The arrangement of the valve gear is noteworthy. The starter is electric, and the ignition is supplied by one generator.

* From *Aviation*, U.S.A.

Aircraft and Squadron Manœuvres

DURING the exercises at sea of the Atlantic Fleet, starting from Portland this week, part of the practical work to be tried out on the way down Channel was to be attacks delivered by latest type submarines and seaplanes, possibly with the idea of helping to a solution of the Sir Percy Scott query as to the battleship being "any damned use at all."

U.S. also Testing Aircraft with their Squadrons

FROM New York particulars of some test flying by a squadron of naval seaplanes operating in connection with the Atlantic and Pacific Fleets, are to hand. Twelve of these craft, leaving two to follow, arrived at Panama on January 16, having flown in company from San Diego, Cal., a distance of 3,200 miles, to meet the two fleets for combined manœuvres, the journey occupying 17 flying days. The longest stage was from Salina-Cruz to Fonseca Bay, 500 miles, which was flown without a stop.

Dentists and the R.A.F.

A ROYAL Warrant has been issued to authorise the formation of a corps to be entitled "The Army Dental Corps." The corps will be administered by the Director-General, Army Medical Service, and will be a joint service for the Army and Royal Air Force. *Personnel* will be required to serve under either force, and will be interchangeable.

Commissions as lieutenants may be given to persons duly qualified under regulations approved by the Army Council; an officer will be eligible for promotion to the rank of captain on completion of 3½ years' service in the corps; while promotion to the rank of major and lieutenant-colonel to fill establishment will be made by selection of the Army Council. On the formation of the corps, certain appointments will be made in the rank of lieutenant-colonel and major to fill the establishment. The remainder of the appointments will be in the rank of lieutenant, except in cases where service of 3½ years or more has been given as a temporary dental officer, when the rank of captain will be given. Service as a temporary dental officer will count towards the 3½ years for promotion to captain.

A Batch of Seaplanes Lost

OWING to the French cargo boat *Evangeline* from Cherbourg, being wrecked at Port Lorient, a number of seaplanes which she was carrying are reported as lost.

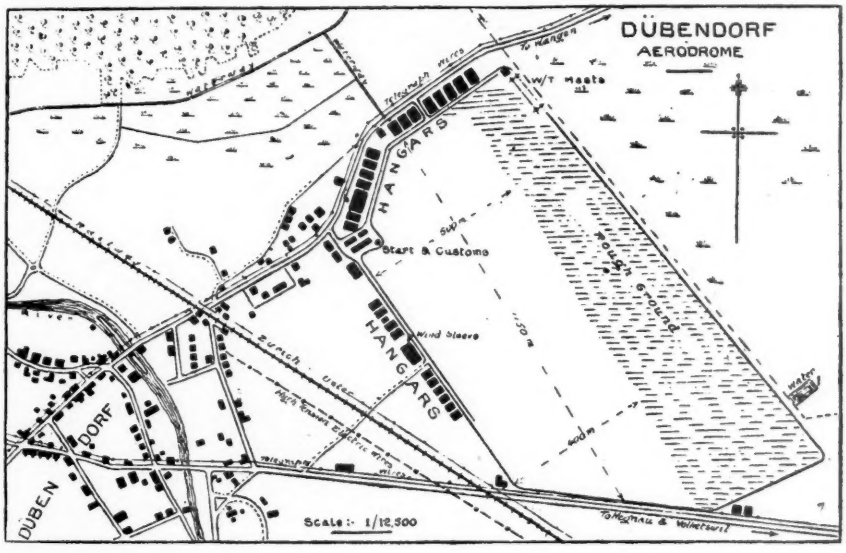
NOTICES TO AIRMEN

Donibristle Aerodrome—Ground Levelling

WITH reference to Notice to Airmen No. 49 of 1920, pilots are warned that ground levelling operations are in progress at Donibristle aerodrome, Fife (56° 2′ 0″ N., 3° 21′ 0″ W.), and that care should therefore be exercised in landing machines at this aerodrome. No. 2 (1920).

Markings. The letters "DUEB" will shortly be marked in white letters on the ground, each letter being 8 metres by 5 metres. The letters will be illuminated by night. There is a wind sleeve on the south-western side of the ground.

Night landing arrangements. None at present, but a light-house or searchlights will be installed later.



Switzerland—Dubendorf Aerodrome

NOTICE to Airmen No. 117 of November 4, 1920, is amended in that the information in paragraph 2 (*a*) concerning Dubendorf aerodrome is cancelled and the following substituted :—

DUBENDORF. Joint civil and military aerodrome. See plan attached.

Position. Latitude 47° 24′ 0″ N. Longitude 8° 38′ 0″ E. Situated approximately 1 km. E.N.E. from the village of Dubendorf, and 8 kms. E.N.E. from Zurich.

Dimensions for landing. 1,000 by 500 metres.

Height above sea level. 440 metres.

Accommodation. Two hangars, each 20 by 80 metres. Twenty wooden hangars, each 16 by 24 metres, situated along the N.W. and S.W. sides.

Supplies, etc. Petrol, oil, water and excellent repair facilities are available.

Wireless telegraphy. Not available at present for general use.

Meteorological reports. Weather forecasts are received daily from the Eiffel Tower.

NOTE.—This aerodrome is difficult to distinguish from the air, as the sheds do not show up well, and the aerodrome itself, owing to cultivation, does not contrast with the surrounding ground. No. 3 (1921).

ROYAL AERONAUTICAL SOCIETY NOTICES

Lectures.—At the next meeting on Thursday, February 3, two papers will be read : "The Use of Meteorology to Aviation and Vice-Versa," by Major G. Dobson, and "Ground Engineering," by Wing-Commander H. W. S. Outram, C.B.E., Associate Fellow.

New Members are reminded that cards are not now circulated to members, but that the only notifications of lectures or special arrangements are contained in the weekly notices in the Press and notices in the Journal.

Library.—The following books have been received and placed in the Society's Library :—"The Theory of Direct-Current Dynamos and Motors," by John Case, M.A., A.F.R.Ae.S., several meteorological pamphlets presented by the Smithsonian Institution, and the Official Year-Book of Scientific and Learned Societies, 1920.

W. LOCKWOOD MARSH, Secretary

CAMBRIDGE UNIVERSITY AERONAUTICAL SOCIETY

(OFFICIAL ORGAN, "FLIGHT")

THE following is the syllabus for the Lent Term :—

January 19.—Major T. Orde Lees, "Parachutes."

January 20.—Air-Commodore H. R. M. Brooke-Popham, C.B., C.M.G., D.S.O., A.F.C., "Some Problems in Aeronautical Research."

February 2.—Sir R. T. Glazebrook, K.C.B., F.R.S., F.R.Ae.S., "Some Requirements of the Modern Aeroplane."

February 9.—A. J. Rowledge, Esq., A.M.I.Mech.E., M.I.Aut.E., "The Napier Lion Engine."

February 16.—Prof. L. Bairstow, F.R.S., C.B.E., F.R.Ae.S., "Aerial Manœuvres and Stability."

February 23.—Lieut.-Col. H. T. Tizard, A.F.C., F.R.Ae.S., "Possible Developments in Aircraft Engines."

March 2.—Presidential Address. Election of Officers, 1921-22.

March 9.—Sir Napier Shaw, Sc.D., F.R.S., F.R.Ae.S., "The Artificial Control of Weather."

There will be a visit to the Royal Aircraft Establishment on March 15 and 16, and members will receive detailed notice of this in due course. There will also be one or two subsidiary visits during the term, and members will find the notice of these on the Society's Notice Board. All meetings commence at 8.30 p.m. Further particulars will be found in the Weekly Notices.

O. E. SIMMONDS,
Hon. Secretary

Magdalene College, Cambridge.

AIRISMS FROM THE FOUR WINDS.

"WE are at the opening verse of the opening page of the chapter of endless possibilities" (Mr. Rudyard Kipling upon the future of aircraft). This very happy pronouncement was in a letter to Air-Commodore E. M. Maitland, who quoted it in the course of his charming lecture the other day at the annual juvenile gathering of the Royal Aeronautical Society.

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VERY praiseworthy is the appeal of the Prince of Wales for a £200,000 Fund in aid of the Boy Scout movement. From this source there are the greatest possibilities for "feeding" the ranks of the R.A.F., and, no doubt appreciating this, Sir Sam Waring, who was so successfully to the fore during the War in connection with aeroplane construction, is acting as Chairman of the Fund, and backed his opinion by adding £1,000 to a similar amount given by the Proprietors of the *Daily Telegraph*, through whom the appeal is being primarily made. We note also the name of Sir Marcus Samuel, of Shell fame, down for 1,000 guineas, and his gift has a valuable condition attached to it—that at least twenty subscriptions of £1,000 shall be forthcoming. This is merely a "reminder," as there can be no manner of doubt but that the requisite number of Donors will toe the line.

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MR. HOLT THOMAS'S "Aerial Transport" has been translated into Japanese by the Imperial Aero Society of Japan.

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APPARENTLY trouble is already in sight anent those wedding stunts in the air in America. It is a question, as we suggested, of legality according to the State in which they are alleged to have taken place, the respective marriage laws of which are varied and peculiar. Who, it is asked, is to prove that, at the moment of the marriage ceremony, the 'plane was over one State rather than another?

The parties may have complied with all the conditions required by the State of Idaho, but what if too much right control or left control has taken the machine over Wyoming or Oregon? It looks as though a captive balloon might be a safer choice is the suggestion of one optimist.

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RUMOUR hath it that by the summer of 1922 a very extensive Trans-Atlantic airship service will be in operation, with preliminary flutters this year. Lisbon is named as the regular jumping-off point, with London as the port for the return journey.

ANOTHER rumour this week, which has promptly been discounted, was that Martlesham Heath air station is to be scrapped. Perhaps, but we can hardly think just yet.

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As a result of the important experiments with wireless which Mr. Marconi now has in hand, considerable benefit is likely to accrue to aviation, as the devices with regard to aiding navigation at sea, in foggy and thick weather, are likely to be directly reflected in their application for pilots of aeroplanes and airships.

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THE Zeppelin factories in Germany are said to be very active and alive, although for the moment aircraft may not be the actual goods being turned out. They are, however, in such splendid running order, that at any moment they could be switched over to their old operations.

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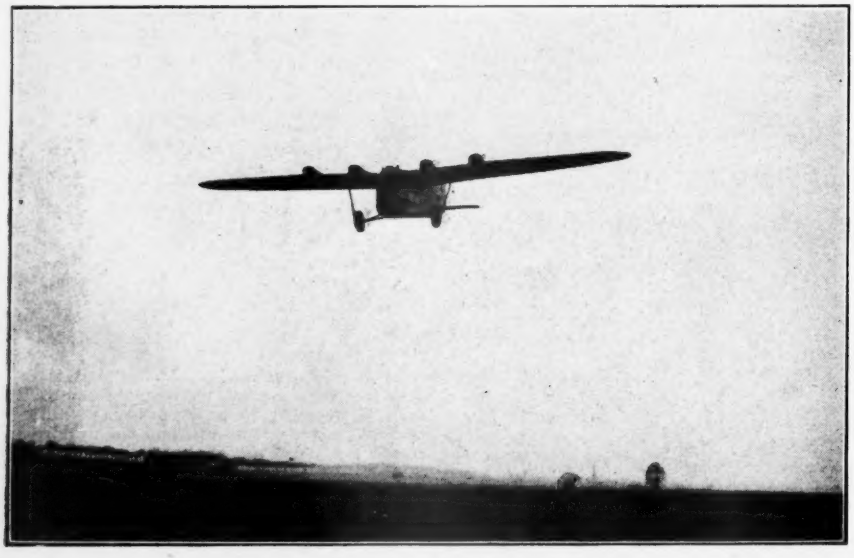
IT is a matter of concern just now, in view of the allegations of the French as to the intentions apparent in the resistance by Germany to the demands of the Allies to scrap their facilities for military aircraft reconstruction. Marshal Foch's recent report upon the subject is instructive in this direction.

Aerial material surrendered by Germany, the Marshal states, includes 26,823 aeroplane motors (or 90 per cent. of the total number of aeroplane engines in Germany), 13,079 aeroplanes and hydroplanes (or 92 per cent. of the total), and six airships. The Allied Control Commission, however, has discovered important hidden stocks of aerial material, including 7,930 aeroplane motors and 281 aeroplanes and hydroplanes. The German Government itself, according to the Marshal, has recognised the existence of hidden material, and declares that it is ready to vote a new law rendering its declaration obligatory.

Twenty per cent. of the German aeroplane sheds have been destroyed and 5,000 aeroplane machine-guns surrendered to the Allies, but fresh infringements of the stipulations laid down by the Boulogne Conference have been observed. The Junker factories have built 150 civilian aeroplanes; the Fokker factories have built three, and have one other under construction; the L.F.G. factories are building a new type of hydroplane. In the Sablatnig factories three civilian aeroplanes have been built, and one is now under construction. Eleven aeroplanes have been discovered at Hamburg



The Zeppelin Staaken Monoplane in Flight: This machine, which is built of metal throughout, was described in a recent issue of FLIGHT. It carries 18 passengers in a comfortable cabin. Our photograph gives an excellent idea of the arrangement of the engines. The yawing moment set up by the cutting-out of one of the outer engines must be very great, and this feature would appear to be a very bad one in an otherwise good design.

and have been confiscated. The German Government has refused to surrender spare pieces for airships, on the ground that they were manufactured and are intended for commercial airships.

Air-Commodore Masterman, whose report supplements that of Marshal Foch, concludes by stating that the Germans, since the beginning of December, have displayed "systematic indications of opposing and resisting the claims of the Allies, and have shown a firm determination, by continually employing tactics that will involve delay, not to fulfil the Peace Treaty."

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THAT aviation will be a prominent factor in the everyday life of the civilised world is referred to by Professor F. K. Moulton, the well-known scientist of the University of Chicago. In dealing with the wonders of the future the other day before members of the American Association for the Advancement of Science, at Chicago, he dismissed the permanence of aviation as a foregone conclusion, in his estimate of future scientific possibilities. Starting with the rather minus estimate of the intelligence of man today which he placed on a par with that of a toad as compared with what it will probably be in future years, the Professor was on fairly safe ground in suggesting that the present human mind could not comprehend the mental superiority of our successors a few million years hence. Continuing, he acclaimed: "It is merely foolish to talk of making an aeroplane as safe as a tramcar, because that is simply a matter of a few years. Greater things and newer sciences and discoveries which will make the wonders of this age fade into simplicity will probably come out of the distant future. Forces," he declared, "will be discovered which will make electricity and radium pale."

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WE'RE glad to know we shan't after all have to hang about those few million years for our Government to get on a hustle aerially.

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SIR PERCY SCOTT'S latest pronouncement in connection with the "Capital Ships or ——" controversy, is as follows:—"In trying to arrive at the utility of the super-Dreadnoughts we must bear in mind that the earliest date on which the first one could be completed is the summer of 1923, and we must consider what improvements will possibly be made in the new weapons during that time. One thing that I think we can make sure of is that all seagirt countries will secure themselves against attack by building submarines and aeroplanes, and that they will devise a torpedo carrying a charge of T.N.T. sufficient to blow the bottom out of our £9,000,000 battleships."

Order of the British Empire

THE King has given orders for the following promotion in, and appointment to, the Order of the British Empire for services in connection with the War (to be dated January 1, 1920):—

(C.B.E.) Commander

Henry Ernest Spry, Esq., Chief Establishment Officer, Aircraft Production Department, Ministry of Munitions.

Sadi Lecointe Decorated

M. LECOINTE, the well-known French pilot, has been created a Chevalier of the Legion of Honour.

Aero Club de France Grand Prix

ENTRIES closed for the above on January 15, when the engagement of ten machines had been notified to the Club. These, with probable pilots, were: 1. Nieuport (Sadi Lecointe); 2. Bréguet, type 20 (Roget); 3. Bréguet, type 18; 4. Caudron, triple motor, type 39; 5. Farman, single motor (Jean Bernard or Drouin); 6. Farman (Goliath) (Ferdinand d'Or or Coupet); 7. Blériot (de Romanet); 8. Blériot (Casale); 9. Potez (Douchy); 10. De Marçay (Benoit). The Farman (5) is a special machine for the contest, and rumour credits it with very great carrying capacity combined with a big turn of speed. The new Spad-Herbemont commercial machine (No. 8) down to be piloted by Jean Casale last week, was tested by this clever pilot before the *Service Technique*. The machine carries five passengers at a cruising speed of about 124 m.p.h.(?), and with a range of 6 hours' non-stop flight. The weight empty is given as 1,000 kg. and the loaded weight as 2,000 kg., the load carried being equal to the empty weight of the machine. The wing area is about 465 sq. ft., giving a wing loading of just over 9½ lbs. per sq. ft. The engine fitted is a Salmson type Z9, of 250 h.p., so that the power loading is 17.6 lbs./h.p. During the tests the machine with full load climbed to 3,500 metres in 47 mins.

Apropos this discussion in which the vital importance of aircraft has not so far been taken sufficiently into consideration, "N.O. (retired)" in a letter bearing upon the general aspect strikes a new note, well worthy of giving serious thought to those who know what the internal combustion engine, outside the realm of the air, did during the War. "N.O." sarcastically concludes his views with the words: "No, sir, battleships may be doomed, but the end is not yet. Coastal motor boats are today sounding the death-knell of the big ship, and so the Admiralty are closing down the C.M.B. base at Osea Island!"

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Now that parachuting seems to be getting active again new record claims should not be accepted too readily. By way of instance, a parachute jump from an aeroplane flying at 100 m.p.h. by M. Jean Orrs at Nice the other day, was thus put forward as a new record. This, however, has been quickly laid to rest by Major T. Orde Lees, writing from the office of E. R. Calthrop's Aerial Patents, Ltd., Eldon House, Eldon Street. Major Orde Lees writes:—"I do not want to rob Monsieur Orrs, whom I know quite well, of his laurels, but in October, 1918, I jumped from an English machine at Isle of Grain, officially timed to be flying at 130 miles an hour over the ground and 100 miles an hour air speed as shown in attached cutting.

"Owing to the high speed of the wind I purposely dropped into the water. The height was less than 400 feet, which is very low for parachuting, and can only be attempted with parachutes having some device for positive-opening, like the Orrs' parachute and the Guardian Angel parachute.

"Again, at Dayton, Ohio, on July 11, 1919, I dropped at only 250 feet from a machine flying at 120 miles an hour with a similar parachute."

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"BUT the most remarkable jump of that kind," continues the Major, "was made by Miss Sylva Boyden, the English air-girl, at Copenhagen, on October 3, 1920, when she jumped from a German machine with a German pilot flying at 190 miles an hour over the ground. The wind at the time was 90 miles an hour in the air and 60 miles an hour on the ground. This is easily a record for speed."

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THERE are those—short-sighted things—who insist that "H.P." and others who have helped to make aviation an every-day affair should be put away as being, by their work, a menace to future generations. But really the Editor of the "Poet's Corner" of the *H.P. Bulletin* may easily find himself arraigned for encouraging serious breaches of the peace if he should persist in further encouraging those "poetical" effusions which have recently formed part of the *Bulletin*. Ellup!

Across Australia by Air

A GOOD performance is announced from Melbourne. Mr. C. J. Degaris, with a pilot, on a "D.H. 4" left Brisbane on January 16, at 4.30 a.m., and arrived at Melbourne on the 17th at 8 p.m., having made three landings on the way. The actual flying time for the 1,100 miles covered was 10½ hours.

Fokker Machines for London-Berlin Service

IN the early part of this year it is authoritatively stated that a regular air-service is to be inaugurated between London and Amsterdam, with connections to Hamburg, Copenhagen, and Berlin with a fleet of Fokker commercial monoplanes which are now being built in the works of the Fokker Company at Amsterdam. The service will, by means of the German interior air lines, connect up with all the principal German cities; while the route to Copenhagen will be extended by a seaplane service to connect with Sweden.

The type of machine to be used is that which recently flew over to this country to Waddon Aerodrome, and was described and illustrated in FLIGHT at the time. These Dutch-built machines are all to be equipped with Siddeley "Puma" engines.

More Air Training Centres for France

Now that the French authorities have drawn up their system of reserve-pilots, the scheme is being elaborated so that those joining up shall have every facility for thorough training. Five centres are at once to be established situated at Orly (Seine), Angers, Orleans, Clermont-Ferrand and Bordeaux. These will be under the control of the Navigation Aérienne, the machines being supplied by the Government and the hangars and aerodromes either by the State or by the local associations of pilots and aero-clubs. The civil pilots who join up will each have one hour's flying per month free at one or other of the centres. Rhône-engined Caudron G-3 machines will be employed.

AIRCRAFT v. SUBMARINES

ALTHOUGH it is generally known that aircraft played an important rôle in getting the German submarine menace in hand during the War, so little information on this subject has been vouchsafed to the general public that it has been a matter of some difficulty to form a true opinion of what aircraft actually did do in this sphere of activity. As a consequence there is a danger of falling into one of two errors in attempting to assess the importance of aircraft for anti-submarine work. It has been maintained by some that the value of aircraft for this purpose was really very small, while others have held the opinion that it was aircraft which was the means of keeping the enemy submarines in check. As is usual in such cases, the truth is somewhere between these two extreme views, and it is therefore of no small interest to have an authoritative statement of the part played by aircraft in the fight against the submarine menace. Such a statement was contained in a most interesting paper read by Col. L. H. Strain, O.B.E., D.S.C., before the Scottish branch of the Royal Aeronautical Society on December 15, 1920. Unfortunately lack of space prevents us from publishing in full this valuable paper, which gives, for the first time, the history of aircraft *versus* submarine. In the following abstract, however, we hope to have incorporated the main points of Col. Strain's paper.—ED.]

In his introductory remarks Col. Strain expressed his indebtedness to the Air Ministry for permission to read the paper, and said that he had been requested to make it clear that "the statements made were based entirely on his own knowledge, and the opinions expressed in no way reflected the official views." Towards the end of the War, the lecturer said, the Navy was rapidly getting the submarines' measure, and they were being sunk faster than the enemy could build. It was becoming increasingly difficult to man the submarines and to maintain the *morale* of the crews. This result, the lecturer pointed out, was not achieved by any one arm of the Navy, nor by any particular invention, but was effected by the intensive use and close co-ordination of practically all the resources which the Navy could command.

Col. Strain then referred to the use of submarines for stalking enemy submarines, to the work of mystery ships—"Q boats" they were called—and to the work done by hunting flotillas listening on hydrophones and dropping depth charges. Included in the organisation, and forming an essential part of it, aircraft of all descriptions were used, and became of steadily increasing importance as they developed in efficiency and as their proper use was better understood. The lecturer pointed out that at the beginning of the War there was a tendency among senior Naval officers in charge of anti-submarine operations to overrate the value of aircraft. This is easily understood when it is realised that a seaplane travelling at 60 knots could, with good visibility, search an area of about 600 square miles of sea in one hour, while a trawler steaming at 10 knots could not patrol more than 40 square miles in the same time. Also it was said that from a height one could see through the water, and these officers, somewhat naturally, thought that it was only necessary to get a seaplane over the submarine for the latter to be discovered and her position indicated to surface craft.

While this is quite true, the lecturer said, when conditions are favourable, low clouds render the visibility under water very small, and where the sea is shallow the water becomes muddy and opaque. This is especially so in the North Sea, which is an almost ideal field of operations for submarines, it being so shallow that in most parts the submarine can lie on the bottom without wasting fuel and without making any noise to indicate her position. Col. Strain then pointed out how it came about that at one period of the War aircraft proved a bitter disappointment to senior Naval officers. At the beginning of the War we had no trained observers, and there were only about twenty seaplanes which were in any degree fit for active service. These were mostly equipped with extremely unreliable engines, which broke down completely on an average every two hours forty-four minutes. Consequently pilots and observers were lost, and destroyers had to be diverted from their regular duty. The result was that these officers ceased to ask for the assistance of seaplanes, and the development of seagoing aircraft was retarded. The R.N.A.S. people were then sent to do "stunts" on the Western Front, in competition with the R.F.C.

Early in 1915 the kite balloon was successfully adapted for work at sea while being towed by a ship. Shortly afterwards the "Blimps" made their appearance, and, in conjunction with such seaplanes as were not required for the seaplane-carrying ships, did a lot of haphazard work with little effect. It was not until the War Staff at the Admiralty was reorganised by Lord Jellicoe that there was any marked development in the use of aircraft for submarine hunting. One department of the War Staff was devoted exclusively to anti-submarine measures, and was put under the charge of Admiral Duff. An organisation embracing all areas of submarine activity and a programme of development were settled. Practically a new service came into being, which had no inconsiderable effect in countering the activities of enemy submarines. Owing to the importance attached by the War Cabinet to the bombing of Berlin, the anti-submarine development was subordinated to the equipment of a large Independent Air Force, and had not, therefore, nearly attained full growth by the time the Armistice was declared. Much has, however, been done, and the effect on the course of the enemy's submarine campaign was abundantly clear.

The lecturer then pointed out three principal ways in which aircraft can be used effectively against submarines:—

"1. They can attack the submarine bases, sinking submarines in port, destroying their torpedo and other stores, wrecking the machinery and appliances for repairing and refitting the submarines, and killing personnel.

"2. Aircraft can patrol very large areas at sea, attacking submarines when found, directing sea-borne patrols to the place and compelling submarines to remain submerged, when their effective range is greatly reduced.

"3. Aircraft can be used defensively to escort and protect shipping, and locate minefields."

With regard to the first, *i.e.*, attack on submarine bases, the lecturer called attention to the German submarine bases at Ostend, Zeebrugge, and Bruges, and to the establishment of the Naval Air Station at Dunkirk for the purpose of attacking these bases. By way of illustrating the intensity of these attacks he gave the following figures of bombs dropped between April and September, 1918:—

"In all, 10,432 bombs were dropped, weighing 847,904 lbs., or just on 334 tons of bombs. On the average 57 bombs were dropped on them every day or night.

"The figures are:—

	Bombs.	lbs.
Zeebrugge	2,254	189,871
Ostend	2,841	184,000
Bruges	4,284	378,032
Canal objectives	833	47,339
Submarines in harbour or entering or leaving ..	220	48,662
	10,432	847,904

"The bombs varied in weight from an enormous thing weighing 1,600 lbs. down to little 16 lb. and 40 lb. incendiary bombs."

Col. Strain then mentioned that in order to protect their submarines the Germans built immense concrete shelters, and that even these were insufficient, as the submarines could be caught entering or leaving the shelters, and even when under cover direct hits with bombs caused more than one shelter to collapse. Finally after the blocking of Zeebrugge and Ostend by the *Vindictive*, the bases were abandoned, and the submarine campaign carried out from the bases in the Heligoland Bight, which were much farther from their objectives.

In order to have the best chance in the second field of usefulness, that of attacking submarines at sea, the lecturer pointed out that there must be specially trained officers in suitable aircraft, working in close co-operation with surface craft and being supplied with the latest intelligence regarding the movements of enemy submarines. On the subject of training Col. Strain called attention to a number of the problems with which the observers are confronted, and stated that these called for careful and lengthy training, much more training than that required to become an efficient pilot. He then mentioned that later a submarine-hunting school was started, where all these subjects were taught and where, in addition, observers had an opportunity of practising with our own submarines, and where officers of the submarine and submarine-hunting services were taken up in aircraft so that they could appreciate the advantages and difficulties of the Air Service.

As regards suitable aircraft, Col. Strain said that the first essential is perfect view ahead and underneath, qualities which are found in the "pusher" and "twin-tractor" type of machine. Silence is another desirable feature. Speed is not so essential as long endurance. Further, the lecturer said, the machine must be capable of alighting upon and rising from a fairly rough sea. This is of particular importance for several reasons, among others that a seaplane can alight and "listen" on her hydrophone, an instrument somewhat like a telephone

receiver, some of which can pick up the sound of underwater propellers at a distance of 15 miles. On the other hand, the noise of an aircraft engine and propeller, even when the aircraft is on the sea close to a submarine, cannot be heard on the submarine's hydrophone. The advantages thus gained are obvious, and Col. Strain pointed out that if a submarine is located in a particular area, a flight of four seaplanes can be sent out, three spreading themselves out at extreme hydrophone ranges, say about five miles apart, the fourth remaining in the air to attack as directed and to work the wireless. In an hour they can make a hydrophone search of an area of 400 square miles without the submarine knowing that she is being hunted, unless she comes to the surface, in which case the machine in the air has a chance of sighting and bombing her. If the machines on the sea hear a submarine, the three should be able to get a bearing of the sound and plot the position of the submarine with sufficient accuracy to taxy over the spot and depth-charge her.

The lecturer then mentioned the advent of the "Large America" type flying boat, which, with her twin-engines, gave the observer an excellent view, and had a better range and lifting capacity. Regarding one of these boats, the lecturer told of how she came down in the Heligoland Bight during very bad weather, so bad that the Harwich light forces could not go out and search for her, and she was given up as lost. Her crew, however, rigged up a sea anchor to which she rode for three days, drifting across the North Sea. When the gale moderated she got her engines going and taxied into harbour under her own power. The submarines of those days, the lecturer said, had periscopes which could not see more than 30 degrees from the horizontal. Moreover they were thick and left a very noticeable "feather" in the water. Consequently the earlier large flying boats sank six submarines and damaged others before the enemy realised this disadvantage.

As usual, however, the improvement in attack was followed by improvement in defence. The enemy periscopes were made thinner, leaving a much smaller "feather," and the submarines were provided with "altiscopes," by means of which they could examine the sky before coming to the surface. Gradually the areas of submarine activity by day became farther removed from air stations, and in the areas within reach from these stations work was mostly confined to the night time. This led to the use of floating bases from which the seaplanes could operate, and in the night time the use of aircraft was mostly confined to listening on the hydrophones and dropping parachute flares which illuminated a large area and thus compelled the submarines to submerge, which prevented them from getting into position for attacking shipping and, more important still, prevented them from recharging their batteries. In this manner the average length of cruise of submarines operating on the East Coast was reduced from seven days to five days.

On the question of armament of anti-submarine aircraft Col. Strain pointed out the two main conditions arising, *i.e.*, the submarine on the surface, and submerged. In the former case, he said, bombs which were fused to detonate below the surface might not injure her, even if they make direct hits. He mentioned two cases where bombs with time fuses made direct hits on submarines on the surface, splintering without doing much damage. If the submarine has submerged the problem is naturally more complicated. "She may," Col. Strain said, "have submerged to periscope depth only, about 26 feet, or she may go to her maximum diving depth of about 180 feet." Then there is the question of how far ahead to drop the bombs. This will of course depend on several things, such as the depth of the submarine, whether she is still on her dive, in which case her forward speed will be small, whether or not she has taken up her dive, and whether she is likely to hold her course or turn to right or left. The only satisfactory method is, in the opinion of the lecturer, to strew the whole area with bombs fused to detonate at all depths. For this purpose patrols should be undertaken by a flight of weight-carrying aircraft working together rather than by single machines.

The lecturer referred to the advantage of close co-operation between aircraft and surface-hunting craft, which can carry a greater weight of explosives than can present-day aircraft. The three essentials for success in the co-operation are given by Col. Strain as "A knowledge of the powers and deficiencies of the arm with which one is co-operating; adequate signalling between the two arms, and perfect trust in the other arm knowing and carrying out its own job." Finally the lecturer referred to the organisation and to the development of the intelligence system, which during the latter part of the War enabled a much better idea to be formed of where the submarines would operate at a given time, how many there would be, and how long each was likely to remain out before having to return to its base.

Turning to the use of aircraft for defence against submarines, the lecturer dealt with the work of escorting surface craft, locating minefields and destroying mines which had come to the surface. He then gave the following figures for the year 1918: "4,869 escort flights were undertaken by seaplanes and aeroplanes. Only two vessels were attacked while under escort, and on one of these occasions the observer saw the track of the torpedo and was able to signal and warn the ship in time for her to alter her course and avoid the torpedo. 2,141 escort flights were made by airships, only one vessel being attacked while so escorted, and on that occasion the airship was five miles away from the ship. 131 escorts were made with kite balloons towed from surface escorting craft, during which three vessels were attacked. On two of these occasions the approach of the torpedo was observed from the kite balloon."

It was pointed out that the success of aerial escort is not so much due to aircraft being able to prevent attack as to the fact that the track of the torpedo is very apparent from the air. The knowledge of the submarine commander that as soon as he makes an attack the position where the torpedo track begins will be bombed, acts as an excellent deterrent. The superiority in certain respects of airships over seaplanes and aeroplanes for this work was mentioned, notably that of longer endurance and ability to cruise slower around the convoy. On the other hand the airship takes longer to get over the torpedo track and bomb it. On balance, however, it appears that Col. Strain rather regards the airship as a useful scarecrow, as he states that only one submarine was sunk and one damaged by an airship. The lecturer than gave the following statistics:—

"For example, take the aircraft operating on the north-east coast of England from July 1 to September 30, 1918. There were 58 days on which no flying was done by airships. On these days 40 attacks were made by submarines on British shipping, and 29 sightings, mostly followed by attack, were made by seaplanes and aeroplanes on enemy submarines. Airships in that area only sighted submarines on four occasions during the three months."

The defensive value of aircraft in preventing attack on shipping, locating minefields and diverting traffic from danger zones cannot be assessed in figures. No one can hazard a guess at the numbers of ships saved or the tonnage of supplies brought safely to Britain because of the work of aircraft. It must be very large. Other results are known and give some indication of the value of aircraft in anti-submarine warfare: in 1917 submarines were sighted from aircraft on 169 occasions, of which they were attacked on 106. In the nine months of 1918 submarines were sighted 192 times, of which 130 resulted in attack.

It must be remembered that in 1918 aircraft were much more devoted to escort work, which accounts for the greater mileage flown for every submarine sighted. As an indication of the expansion of the work, the distance flown by aircraft on submarine patrol in home water in 1917 was 1,526,475 miles, while in the nine months of 1918 this had increased to 4,801,347 miles, nearly three times as much. Prior to 1917 only one submarine was known to have been seriously damaged by aircraft. That was in 1915. In 1917 seven were sunk and fifteen seriously damaged by aircraft. Six of the submarines sunk, viz.:—"U.C. 36," on May 20; "U.C. 1," on July 24; "U.B. 20," on July 29; "U.B. 32," on August 18; "U.C. 72," on September 22; and "U.C. 6," on September 28, were sunk by "Large America" seaplanes unaided. One submarine, "U. 69," was sighted from a kite balloon towed by *Patriot*, which was directed where to drop her depth charges and sank the submarine.

"In 1918, 4 submarines were sunk, 6 seriously and 20 slightly damaged by aircraft. All the submarines sunk were finished off in co-operation with surface craft. They were:—"U.C. 49," on May 31, and "U.C. 70" on August 28, both of which were found by fairly fast aeroplanes with a good view ahead. "U.B. 83" was sighted from *Ophelia's* kite balloon, which directed her over the spot, and "U.B. 115" was sighted from airship "R. 29" on September 29, and sunk by her in co-operation with destroyers and trawlers."

"Everyone engaged in the anti-submarine campaign will always regret that the ultimate test of their organisation was not carried through. In October, 1918, the tracking department of the Intelligence Division traced a hiving homewards of enemy submarines and their concentration in the North Sea off the entrance to the Firth of Forth. From this and other indications it was apparent that the concentration of submarines was to play an important part in Germany's last gamble, a general Naval action.

"Unfortunately the enemy fleet refused to put to sea, and the last test of whether we could rely on ourselves to defeat the submarines or whether, as politicians want, we should ask a League of Nations to prohibit their use in future wars and so confess our impotence, remains undecided. *I firmly believe, however, that so long as the Navy and the new Air Force work wholeheartedly together and are given enough money for practice flights and experiment, we need not fear the submarine in future campaigns.*" [The italics are ours.—ED. FLIGHT.]

THE ROYAL AIR FORCE

London Gazette, January 4

Administrative Branch

Lieut. H. F. D. Lane is transfd. to the unempld. list; September 25, 1919.

Technical Branch

Sec.-Lieut. to be Lieut. R. W. Mouro (since demobilised); April 2, 1918.

Memoranda

Two Overseas Cadets are granted temp. commns. as Sec.-Lieuts., with effect from February 15, 1919, and relinquish such commns., with permission to retain the rank.

Twenty-six Cadets are granted hon. commns. as Sec.-Lieuts., with effect from the date of their demobilisation.

London Gazette, January 5

Permanent Commissions

Flying Officer G. Bowen is granted a permanent commn., retaining his present substantive rank and seny.; Aug. 1, 1919.

The following are granted permanent commns. in the ranks stated, with effect from the dates indicated, retaining their present seniorities in those ranks:—

Flight Lieuts—W. H. E. Kemp, A.F.C.; Sept. 12, 1919. A. H. Peck, D.S.O., M.C.; Oct. 24, 1919.

Flying Officers.—H. O. Brown, M.M.; Sept. 12, 1919. G. D. Daly; Oct. 24, 1919. T. A. Langford-Sainsbury, A.F.C.; Sept. 12, 1919. H. N. Young, D.F.C.; Oct. 24, 1919. *Gazettes* of the above dates, appointing these officers to short service commns., are cancelled. Flight Lieut. W. W. Wakefield is granted a permanent commn. as Flying Officer, with seny. of April 1, 1918, and precedence next below Flying Officer B. E. Harrison, A.F.C.; Oct. 24. 1919. Flying Officer G. E. Creighton resigns his permanent commn., and is permitted to retain the rank of Lieut.; Jan. 6.

Stores Branch

Sqdn. Leader G. Laing, O.B.E., and Flight Lieut. C. F. Rasmusen, O.B.E. are transferred to the Stores Branch with effect from Dec. 31, 1920, and promoted to Wing Comdr. and Sqdn. Leader respectively; Jan. 1.

The following are granted permanent commns. in the ranks stated, with effect from the dates indicated, retaining their seny. in the substantive rank last held prior to the grant of this commn., except where otherwise stated:—

Flying Officers.—F. A. Osborn, M.M.; June 17, 1920. J. K. McDonald (previously known as J. McDonald), E. Meynell, D.C.M., H. J. Payne, F. Whilton, D.C.M.; July 20, 1920.

Flying Officer (from Pilot Officer).—F. C. Griffin; July 20, 1920, and with seny. of that date.

The following are granted permanent commns. in the ranks stated, with effect from the dates indicated, retaining their present seniorities in those ranks (except where otherwise stated), and are transferred to the Stores Branch with effect from June 17, 1920:—

Flying Officers.—T. H. Evans (since promoted), C. H. Masters; Sept. 16, 1919.

Flying Officers (from Pilot Officers), with seny. of the dates indicated:—W. B. Frederick; Oct. 24, 1919. R. W. Stevenson, A. T. Wells; Sept. 12, 1919. *Gazettes* of above dates, appointing these officers to short service commns., are cancelled.

Flying Officer G. E. Payne is granted a permanent commn. with effect from Jan. 1, 1920, retaining his present substantive rank and seny., and is transferred to Stores Branch with effect from June 17, 1920.

R.A.F. Medical Service

The following Sergt.-Majs., Class I, are granted permanent commns. as Qrmrs. (Medical and Flying Officers, with effect from dates indicated:—187485 C. B. Willsher; Aug. 1, 1919. 302630 W. Gamblen; July 1, 1920. 301542 F. W. Goodread; Sept. 1, 1920. 302629 P. H. Musgrave; Nov. 3, 1920 (substituted for *Gazettes* Oct. 12, 1920, and Nov. 16, 1920).

Short Service Commissions

The following are granted short service commns. in ranks stated, with effect from dates indicated, retaining their seny. in substantive rank last held prior to grant of their commn., except where otherwise stated:—

Flying Officers.—P. A. de Fontenay; Dec. 18, 1920 (for four years on Active List). H. B. D. Harrington; Dec. 6, 1920. E. N. Hewitt; Dec. 12, 1919 (substituted for *Gazette* of that date). N. C. Saward; Dec. 29, 1920 (for four years on Active List). R. Stephenson, D.F.C.; Jan. 4 (for four years on Active List). F. F. Tattam; June 23, 1920 (substituted for *Gazette* July 2, 1920).

Pilot Officer on Probation.—E. R. Lush; Nov. 9, 1920 (and with seny. of that date).

The following Flying Officers resign their short service commns., and are permitted to retain rank of Lieut.:—C. G. Gilbert; Jan. 8. R. W. Godfrey; Oct. 30, 1920 (substituted for *Gazette*, Oct. 29, 1920). *Gazettes* of dates indicated, appointing the following officers to short service commns., are cancelled:—Flight Lieut. W. W. Wakefield; Oct. 24, 1919. Flying Officer G. E. Pyne; Jan. 20, 1920. *Gazette* Dec. 17, 1920, concerning Flying Officer W. J. Rivett-Carnac, M.B.E., is cancelled. The name of Flying Officer E. C. Durrant is as now described, not C. E. Durant, as in *Gazette* Sept. 14, 1920.

Stores Branch

The following are granted short service commns. in the ranks stated, retaining their seny. in the substantive rank last held prior to the grant of this commn.:—

Flight Lieut.—G. E. Stagg, M.B.E. (since promoted).

Flying Officer.—R. Adams; June 17, 1920.

Flying Branch

Capt. C. D. Fellowes, M.C., A.F.C., relinquishes his temp. R.A.F. commn. on appt. to the T.F., and is granted the rank of Maj. Capt. F. W. Winterbotham relinquishes his temp. R.A.F. commn. on appt. to the T.F., and is permitted to retain his rank. Lieut. (Hon. Capt.) C. F. Hoyle, M.C., relinquishes his temp R.A.F. commn. on appt. to the T.F., and is permitted to retain the rank of Capt. Sec. Lieut. (Hon. Capt.) G. W. E. Hanmer relinquishes his temp. R.A.F. commn. on appt. to the T.F., and is permitted to retain the rank of Capt. Lieut. C. B. Naylor relinquishes his temp. R.A.F. commn. on appt. to the T.F., and is permitted to retain his rank. Capt. S. L. Dashwood relinquishes his temp. R.A.F. commn. on appt. to the T.F. Reserve, and is permitted to retain his rank. Lieut. (Hon. Capt.) K. R. Simpson relinquishes his temp. R.A.F. commn. on appt. to the T.F. Reserve, and is permitted to retain the rank of Capt.

The following Lieuts. relinquish their temp. R.A.F. commns. on appt. to the T.F. Reserve, and are permitted to retain their rank:—F. H. Lear, R. C. Taylor.

The following Sec. Lieuts. (Hon. Lieuts.) relinquish their temp. R.A.F. commns. on appt. to the T.F. Reserve, and are permitted to retain the rank of Lieut.:—F. C. Hinksman, E. Knowles.

Transferred to Unemployed List:—Sec. Lieut. A. Buckley; Feb. 14, 1919 Sec. Lieut. R. L. Uden; Feb. 15, 1919. Sec. Lieut. J. S. Monteith; Feb. 23, 1919 (substituted for *Gazette*, April 1, 1919). Sec. Lieut. D. M. Jenkins March 4, 1919. Sec. Lieut. C. E. James; March 7, 1919. Sec. Lieut. C. H. L. Needham; April 22, 1919 (substituted for *Gazette*, May 9, 1919). Lieut. H. E. Hervey, M.C.; Sept. 4, 1919. Lieut. H. Hickson; Sept. 24, 1919. Sec. Lieut. A. E. Goodwin; Sept. 26, 1919. Lieut. E. W. Grant; Oct. 11, 1919. Lieut. K. A. Macfadyen; Dec. 10, 1919.

The surname of Sec. Lieut. (Hon. Lieut.) A. C. Cook is as now described and not as in *Gazette*, Nov. 23, 1920.

Notification in *Gazette*, Dec. 21, 1920, concerning Flying Officer S. M. Kinkead, D.S.O., D.S.C., D.F.C., is cancelled.

Administrative Branch

Sec. Lieut. R. M. Ferguson to be actig Capt. whilst employed as Capt., from Oct. 1, 1918, to March 19, 1919. Flying Officer A. T. Laing is placed on the Half Pay List (Scale B) (Aug. 1, 1919) and is restd. to the Active List; March 18, 1920.

The following Lieuts. relinquish their temp. R.A.F. commns. on appt. to the T.F., and are permitted to retain their rank:—T. J. Southern, N. J. Wenger.

Transfd. to Unemployed List:—Sec. Lieut. S. H. Pearce; Sept. 4, 1919. Sec. Lieut. W. C. Cranfield; Sept. 15, 1919. Lieut. G. W. C. Dawson; Dec. 18, 1920.

Technical Branch

Lieut. L. E. Carter relinquishes the grading for pay and allowances as Capt. on ceasing to be employed as Capt.; May 27, 1919. Flight Lieut. J. H. Hagon is placed on the Half Pay List (Scale B), from Sept. 19, 1919, to Oct. 6, 1919, on Scale A from Oct. 17, 1919, and is restd. to the Active List; Dec. 1, 1919.

Transfd. to Unemployed List:—Lieut. W. H. Preston, D.C.M.; Oct 10., 1919. Maj. S. M. Cleverley; Oct. 20, 1919 (substituted for *Gazette*, Oct. 31, 1919). Lieut. S. W. Symons; Nov. 14, 1919.

The surname of Lieut. M. J. Golightly is as now described, and not as in *Gazette*, Dec. 3, 1920.

The initial of Lieut. G. Thomas is as now described, and not as in *Gazette* of Dec. 24, 1920.

London Gazette, January 11

Flying Branch

Pilot Officer E. Fulford to be Flying Officer; September 23, 1919.

The following Sec. Lieuts. (late Gen. List, R.F.C., on prob.) are confirmed in rank as Sec. Lieuts. (A.):—D. Miller; Aug. 1, 1918. J. M. Poe; Sept. 19, 1918 (deceased).

Flying Officer J. H. Jephson is placed on half-pay list (Scale B); Dec. 31, 1920.

Sec. Lieut. (Hon. Lieut.) J. C. Kennedy relinquishes his temp. R.A.F. commn. on ceasing to be employed; April 9, 1919 (substituted for *Gazette*, May 27, 1919).

Transferred to Unemployed List.—Lieut. S. Jackson, M.C.; March 8, 1919. Sec. Lieut. F. J. Keble; May 12, 1919. Capt. R. M. Everett; Oct. 11, 1919. Lieut. T. A. Pitt; April 1, 1920. Lieut. A. C. Watson; Dec. 31, 1920. Lieut. S. Ellis; Jan. 1.

Administrative Branch

Sec. Lieut. G. Ryall to be Lieut.; April 2, 1918 (since demobilised). Sec. Lieut. Lou Htin Wah relinquishes his temp. R.A.F. commn. on ceasing to be employed; Dec. 16, 1920.

Transferred to Unemployed List.—Capt. J. E. Harrison; Aug. 23, 1919. Sec. Lieut. T. W. Crawford; Nov. 4, 1919. Lieut. G. E. Tarrant; Dec. 15, 1920.

Technical Branch

Sec. Lieut. H. McK. Barry to be actg. Lieut. whilst employed as Lieut., Grade (A); from Nov. 14, 1918, to Dec. 31, 1918. Sec. Lieut. H. McK. Barry to be actg. Capt. (Grade A), from Jan. 1, 1919, to April 30, 1919, and is graded for purpose of pay and allowances as Capt.; from May 1, 1919, to Jan. 31, 1920. Pilot Officer L. D. Stewart to be Flying Officer (Grade A); Oct. 1, 1919. Sec. Lieut. H. J. Barnham to be Lieut. (Grade A), without pay and allowances of that rank; April 26, 1918 (substituted for *Gazette* Oct. 12, 1920.) Sec. Lieut. W. A. Frame relinquishes his temp. R.A.F. commn. on appointment to T.F., and is permitted to retain his rank.

Transferred to Unemployed List.—Sec. Lieut. H. G. Eggar; Sept. 14, 1919. Lieut. W. O'Donoughue; Nov. 11, 1919 (substituted for *Gazette* Nov. 28, 1919).

Gazette of March 23, 1920, concerning Sec. Lieut. F. C. Griffin, is cancelled.

Medical Branch

Capt. A. E. McCulloch relinquishes his temp. R.A.F. commn.; Jan. 19, 1919 (substituted for *Gazette* Jan. 21, 1919).

Memoranda

Group Capt. R. Gordon, C.B., C.M.G., D.S.O. is placed on half-pay (Scale B); Nov. 26, 1920.

Twenty-seven Cadets are granted Hon. Commns. as Sec. Lieuts., with effect from dates of their demobilisation.

Transferred to Unemployed List (from (S.O.) (Jan. 1).—Maj. G. Dyson, Lieut. D. Smith.

Hon. Sec. Lieut. J. W. V. P. Jennings relinquishes his on R.A.F. commn. on appointment to the T.F.

Hon. Sec. Lieut. E. H. Small relinquishes his hon. commn.

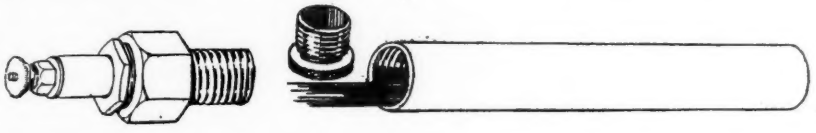
FLIGHT
The Aeronautical Engineer

THE APAX PLUG-CLEANER

MANY a sparking plug which has become foul is laid aside and eventually thrown away for lack of some simple method of cleaning it. This is sheer waste, for, apart from its condition, the plug is perfectly good, and only requires a little attention to enable it to continue its useful career. But to give it that little attention has hitherto been such a finiky, troublesome job, that engine users generally have preferred to buy a new plug. Now, however, with the Apax Cleaner at hand, anyone can get the utmost life from his plugs with the minimum of trouble.

The device consists simply of an aluminium tube with one end closed and the other end threaded to take the plug. Inside the tube is a large number of fine steel wires or needles, which play a most effective part in the process of cleaning. When not in use a plug caps the open end.

The actual operation of transforming an old sooted-up plug into one almost as good as new for all practical purposes consists in half-filling the tube with petrol and then screwing the plug into the top. A vigorous shaking up and down will cause the steel wires to visit every nook and crevice,



The Apax Plug-Cleaner

effectively loosening every particle of carbon and oil, while the petrol will wash away all the deleterious deposit.

There is another advantage of the Apax plug cleaner, however, and that is that by its use there should be no excuse for the plug to get into such a sooted-up state that it is incapable of efficiently performing its intended functions. If every now and again when going round the engine to see that all is in order the plugs are given a little treatment it will be found that they will always be up to the mark, and the engine will not be liable to any mysterious attacks of falling-off of power.

This is one of the accessories which should really find a place in the kit of everybody who has charge of a motor, for the 5s. which it costs, post free, will be very quickly covered by the longer life secured from the plugs and the better running of the engine. It can be obtained from the Aircraft Improvements Co., Ltd., of 10, Coleman Street, E.C. 2, who will also be able to deal with trade enquiries.

French Success Against Tribesmen

FROM Budenib, on the Moroccan-Algerian frontier, it is announced that local levies, assisted by French aeroplanes, attacked and routed with severe loss, a large gathering of rebel tribesmen south-east of Itzer.

A Franco-Belgian Air-Defence League

A NEW Franco-Belgian air-league has been formed recently for mutual aerial defence. King Albert and M. Millerand are named as the "Présidents d'honneur," with, as an Executive President, one of the most prominent French constructors. M. Blériot occupies the position of Vice-President. It is proposed to promote aviation meetings, and generally to act as a Touring Club of the Air, as well as carrying on with defence propaganda. The first effort is proposed for February, when a flying meeting is to be arranged at Nice, quite a number of famous Aces having already promised to participate.

Sweden Asks for a Vote

THE Swedish Ministry of Communications has put forward a demand for a minimum of £40,000 for air traffic during the ensuing fiscal year.

Fifty Breguets Ordered by France

A NICE little order has been placed with Messrs. Liore and Olivier by the French Government for 50 Breguet machines to be delivered during the current year. Two 600 h.p. Hispano-Suiza motors will be fitted in some of these machines, whilst others will probably employ three Rhône motors.

Japan Favours Lorraine-Dietrich Engines

IT is reported that the Imperial Japanese Government have acquired licences for the construction of all types of Lorraine-Dietrich aero engines, Japanese engineers and artisans at the present time being at the French factory obtaining instructions in the building of these engines. The idea is to presently construct these in Japan. The 500 h.p. 12-cylinder type, having a bore and stroke of 126 × 200 mm., is the one particularly favoured by the Japanese.

U.S. Air Service Budgets for 60 Million Dollars

THE U.S. Chief of Air Service has asked from Congress for the next fiscal year ending June, 1922, an apportionment of $60,000,000. The proposed personnel is 1,514 officers and 16,000 enlisted men, and the amounts to be apportioned are as follows:—Expenses of civilian employees, $9,670,206; instruction and operation of air service troops, $4,904,204; maintenance and operation of stations, $172,000; helium exploration, conservation and production, $1,375,250; experimental and research, engineering and development, $3,355,000; production of new aircraft, engines and accessories, $27,167,855; improvements and stations, hangars, shops and gas plants, landing fields, $9,048,000; miscellaneous, $800,426; fuel and lubricants, $3,507,059.

Florida to California in 24 Hours

AN attempt is to be made by Lieut. Alexander Pearson, Jun., and Major H. C. Pratt, Air Officer of the 8th U.S. Corps Area, to fly, on February 22 next, from Florida to California, a distance of 2,079 miles, in 24 hours. It is hoped to get through in three stages. Starting from Pablo Beach, Jacksonville, Fla., the first halt is to be at Ellington Field, Houston, Tex. (804 miles), the second at El Paso (660 miles), and the third Rockwell Field, San Diego, Calif. (615 miles).

A Good Mail Flight

A NON-STOP flight between Reno, Nev., and Salt Lake made by Pilot Kenneth R. Unger, of the U.S. Air Mail Service, has to be recorded. The distance, 437 miles, was accomplished in 3 hrs. 24 mins., the 'plane carrying 50 lbs. of mail. Unger will probably be remembered this side, as it is stated he had to his credit eleven German planes while serving with the R.F.C.

U.S. Navy Aircraft Released

THE Disposal Board of the U.S.A., it is notified, have now released $4,000,000 worth of naval surplus aircraft and engines through the Aeromarine Plane and Motor Co. In the lot are included 125 H.S.2 flying boats equipped with Liberty engines. The idea is that by releasing these craft it is hoped to immediately stimulate commercial flying with the ultimate idea of building up throughout the U.S. a naval flying reserve. The selection of this particular company for the exclusive distribution of the surplus machines, it is stated, was in recognition of the enterprise and activity of the A.P.M. Co. in previously reconstructing and operating similar type and other flying boats.

German Aircraft and Rhineland

CONCERNING German aerodromes in the Rhineland and the neutral zone, and flight over the neutral zone, the German Government has received communication of the decision arrived at by the Ambassadors' Conference. German civilian aeroplanes are prohibited from flying over the Rhineland so long as Germany is not a member of the Air Convention of October 13, 1919, which lays down international rules for aerial navigation, or has not been admitted to the League of Nations. When this condition has been fulfilled German civilian aeroplanes will be allowed to make use even of the military aerodromes of the Allies in the Rhineland, on the same conditions as Allied civilian machines. After the termination of the Allied occupation of the Rhine districts, German civilian aviation will not be allowed to maintain in those districts any permanent establishments which would be incompatible with Article 43 of the Peace Treaty. German civilian machines will be allowed to fly over the neutral zone from the time when the manufacture of aviation material in Germany is again resumed. In accordance with Article 43 of the Peace Treaty, permanent establishments for aerial navigation are not to be set up in the neutral zone.

PERSONALS

Married

Capt. J. G. ARONSON (late R.A.F.), Nairobi, was married on January 12 at Hampstead Synagogue to NETTA ADELAIDE, younger daughter of Mr. and Mrs. M. A. HART, of Alexandra Mansions, N.W.

To be Married

A marriage has been arranged, and will shortly take place, between Capt. PATRICK HUSKINSON, M.C., R.A.F., only son of Col. and Mrs. Huskinson, of Wath, Pateley Bridge, Yorks, formerly of Farndon, Newark, Notts, and Miss ADA MARY DENNEHY, only daughter of the late Maj. Dennehy, R. Irish Rif., and the late Mrs. Dennehy, and great-niece of the late Maj.-Gen. Sir Thomas Dennehy, K.C.I.E., of Brook Lodge, Fermoy, Co. Cork.

COMPANY MATTERS

Aircraft Manufacturing Co., Ltd.

IN the Chancery Division on January 14, Mr. Justice Astbury in the action Houlgate and another *versus* the Aircraft Manufacturing Co., granted a motion for the appointment of a receiver and manager of the company.

Mr. Luxmoore, K.C., for the plaintiffs, said they were the holders of all the debentures issued by the company, the total exceeding £700,000. A resolution for voluntary winding-up has been passed, and there was a petition before the Court for a compulsory order. The moneys under the debentures had become due, and plaintiffs asked for the appointment of a receiver and manager. He understood that Mr. Greenwood, for the company, raised no objection.

His Lordship: You have proved the debentures?—Counsel: Yes. Your Lordship will appoint a receiver and manager with liberty to act at once.

His Lordship replied in the affirmative, and said the managership would be for the usual three months.

It was at a meeting of the Aircraft Manufacturing Co. on December 23 that the shareholders decided the company should be wound up voluntarily, and Sir William Peat was appointed liquidator.

PUBLICATIONS RECEIVED

Aero-Engine Efficiencies. By A. H. Gibson, D.Sc., M.Inst. C.E., Transactions of the Royal Aeronautical Society, No. 3. London: The Royal Aeronautical Society, 7, Albemarle Street, W. 1. Price 5*s.*

Desk Calendar, 1921. A. Butler and Sons, Ltd., 157, Drury Lane, W.C. 2.

The New Hazell Annual and Almanack for 1921. Compiled by T. A. Ingram, M.A., Ll.D. Oxford: Henry Frowde. London: Hodder and Stoughton. Price 7*s.* 6*d.* net.

The Log of H.M.A. "R.34": Journey to America and Back. By Air Commodore E. M. Maitland, C.M.G., D.S.O. London: Hodder and Stoughton, Ltd. Price 10*s.* 6*d.* net.

Clouds. By George Aubourne Clarke, F.R.P.S., F.R.Met. Soc. London: Constable and Co., Ltd. Price 21*s.* net.

Monthly Pocket Diary (January, 1921). Ipenbuur and Van Seldam (J. Stokvis), 73, Cathles Road, Balham Hill, S.W. 12.

Technical Note No. 19. *The Steadiness Factor in Engine Sets.* By W. Margoulis. National Advisory Committee for Aeronautics, Navy Building, Washington, D.C., U.S.A.

Technical Note No. 22. *The Photographic Recording of Small Motions.* By F. H. Norton. National Advisory Committee for Aeronautics, Navy Building, Washington, D.C., U.S.A.

Technical Note No. 23. *Horizontal Buoyancy in Wind Tunnels.* By A. F. Zahm. National Advisory Committee for Aeronautics, Navy Building, Washington, D.C., U.S.A.

Technical Note No. 24. *Development of the Inflow Theory of the Propeller.*—By A. Betz. National Advisory Committee for Aeronautics, Navy Building, Washington, D.C., U.S.A.

Technical Note No. 26. *A Variable Speed Fan Dynamometer.* By Karl D. Wood. National Advisory Committee for Aeronautics, Navy Building, Washington, D.C., U.S.A.

Technical Note No. 27. *Instrument for Measuring Engine Clearance Volumes.* By S. W. Sparrow. National Advisory Committee for Aeronautics, Navy Building, Washington, D.C., U.S.A.

Technical Note No. 29. *Progress Made in the Construction of Giant Aeroplanes in Germany during the War.* By A. Baumann. National Advisory Committee for Aeronautics, Navy Building, Washington, D.C., U.S.A.

Catalogue

Sunbeam 1921 *Models.* The Sunbeam Motor-Car Co., Ltd., Moorfield Works, Wolverhampton.

The Mainland to Havana by Air

A NEW American concern, the Transair Company, has been incorporated with a capital of $300,000, with offices at 522, Fifth Avenue, New York, for the purpose of operating a commercial aerial line for passengers and express freight between Key West and Havana. At present the distance of 92 miles requires an average of 6 hours for the sea trip, whilst the Transair Co. are scheduling their aircraft for one hour, a saving being made of 5 hours between the U.S. and Cuba. Three F.5 L. naval flying boats converted into passenger planes will be the operating machines, making two round trips per day and linking up with mainline trains. Each flying boat has a capacity of 15 passengers, 1,000 lbs. of freightage, and fuel sufficient for the two round trips. Two 400-h.p. Liberty motors are used for each, and a pair of cabins are said to be fitted up with every reasonable luxury. The Company expected to be in operation at the commencement of this week.

Junker All-Metal Planes for the U.S.

FOR some little time round about a dozen Junker planes have been held up at Hamburg by the Inter-Allied Commission of Control. From New York we learn that these were recently released, and have been shipped to John Larsen, the Junker's representative in the States. It was Larsen who originally placed some of these planes with the U.S. Post Office Department at £4,000 apiece. He is sufficiently sanguine to anticipate the call in the immediate future of 400 Junkers, several having been, it is stated, already ordered by the Navy Department.

AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: **cyl. = cylinder; I.C. = internal combustion; m. = motors**
The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

APPLIED FOR IN 1919

Published January 20, 1921

20,300. J. F. PONT. Rotary I.C. engines. (131,591.)
23,192. D. J. MOONEY and S. CROWE. Planes for aircraft. (155,639.)
23,647. G. CAPRONI. Flying-machines. (133,052.)
23,695. H. HOLLINGDRAKE. "In motion" recorders for aircraft. (155,659.)
24,812. L. ROUX. Four-stroke sleeve-valve I.C. engines. (155,673.)
24,946. A. E. WOODMAN. Radiator fins for air-cooled I.C. engines. (155,677.)
31,650. BOULTON AND PAUL and J. D. NORTH. Aeroplane wings. (155,706.)
32,027. A. BONTEMPELLI. Apparatus for dropping articles from aircraft when in flight. (155,709.)

APPLIED FOR IN 1920

Published January 20, 1921

8,329. F. STOKLOSA. Flying-machine. (155,733.)

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